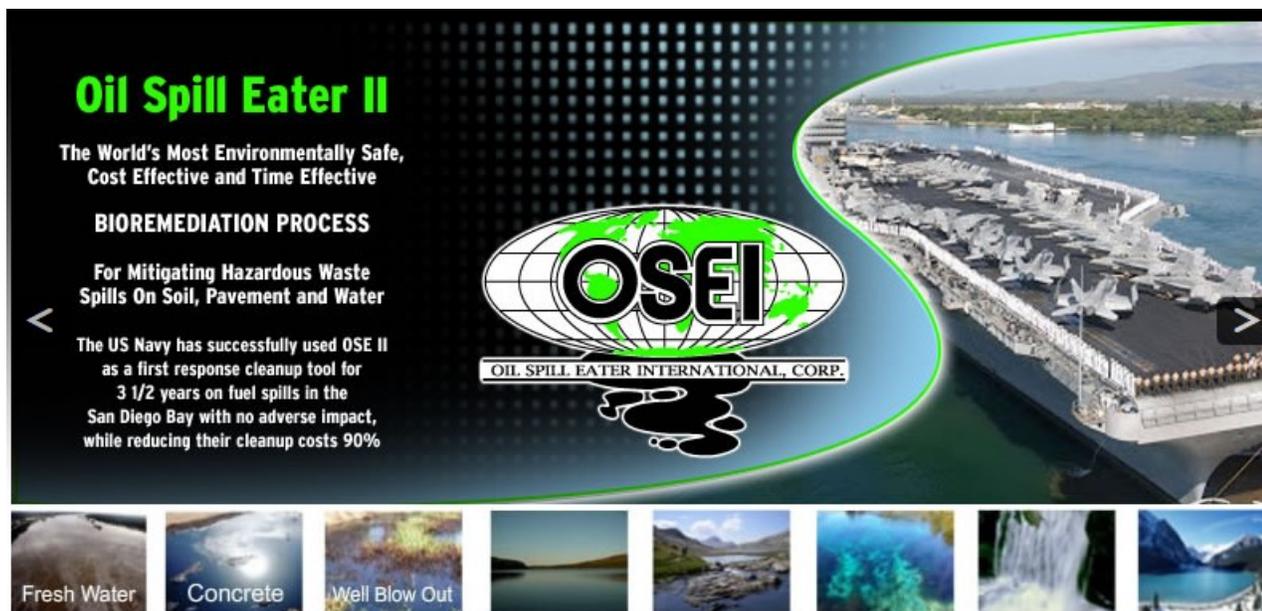


# OSE II

## Oil Spill Eater – Produs ecologic de bioremediere naturala a hidrocarburilor

OSE II ESTE COMPUS DIN SUBSTANTE UTILIZATE IN INDUSTRIA ALIMENTARA SI ENZIME PENTRU DECONTAMINARE ECOLOGICA MEDIU (SOL, SUBSOL, APA DULCE, APA DE MARE SI BIODIVERSITATE) CA URMARE A DEVERSARILOR DE TITEI SAU A ALTOR HIDROCARBURI REZULTATE DIN SCURGERI DE BAZINE, REZERVOARE, CONDUCTE, ERUPTII SAU AVARII LA MIJLOACELE DE TRANSPORT NAVALE, CF SI AUTO



**Oil Spill Eater II**

The World's Most Environmentally Safe,  
Cost Effective and Time Effective

**BIOREMEDIATION PROCESS**

For Mitigating Hazardous Waste  
Spills On Soil, Pavement and Water

The US Navy has successfully used OSE II  
as a first response cleanup tool for  
3 1/2 years on fuel spills in the  
San Diego Bay with no adverse impact,  
while reducing their cleanup costs 90%

**OSEI**  
OIL SPILL EATER INTERNATIONAL, CORP.

Fresh Water Concrete Well Blow Out

**US EPA NCP  
LISTING OF OSE II**

**US DOD  
DEPARTMENT OF DEFENSE**

**US COAST GUARD**

OSE II NU CONTINE NICIUN FEL DE SUBSTANTE BIOLOGICE  
ASIGURA IN MAJORITATEA CAZURILOR O DESCOMPUNERE IN PROPORTIE DE 98-99.5% A  
HIDROCARBURILOR CU REZIDUU DE CO<sub>2</sub> SI APA, DUPA DESCOMPUNERE  
PRODUSUL SE AMESTECA CU APA DE MARE SAU APA DE LAC CU BIODIVERSITATEA PREZENTA (SURSE  
NEPOLUATE) RATIE DE 25,50 SAU 100 :1 IN FUNCTIE DE CONDITII SI SE IMPRASTIE PE ZONA AFECTATA  
REACTIA DE DISPARITIE A CONTAMINARII PETROLIERE ESTE APROAPE INSTANTANEE

- DEMONSTRATII VIDEO  
Cuvinte cheie "OSE II OIL SPILL" pe YOUTUBE

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## **Informații despre utilizarea produsului OSE II in rafinarie**

Compania OSEI activeaza începând din 1989, curățând eficient și din punct de vedere economic, precum și în siguranță, produse rafinate și nerafinate, ulei / combustibil și hidrocarburi.

OSE II este un prim produs de bioremediere care reduce rapid toxicitatea hidrocarburilor, proprietățile de adeziune, inflamabilitatea, vaporii și determină hidrocarburile să plutească pe apă, prevenind migrarea acestora în coloana de apă sau în apa subterană.

OSE II a fost utilizat cu succes in peste 20.000 de scurgeri accidentale, pe parcursul carora s-au efectuat sute de teste , care au avut ca rezultat descompunerea hidrocarburilor

OSE II nu necesită curățare secundară sau absoarbere; solul și apa pot fi recuperate și reutilizate după ce OSE II a remediat hidrocarburile din acestea, in-situ, atat pentru apa cat si pentru sol.

OSE II a fost utilizat in rafinării, ca cea de la Sommerset din Kentucky si de peste 15 ani in rafinăriile din străinătate.

OSEI Corporation are, in primul rand, un produs sigur de bioremediere ,care transformă hidrocarburile în CO<sub>2</sub> și apă, permanent, inlaturand hidrocarburile din mediul înconjurător (sol si apa, inclusiv apa de mare).

OSE II (Oil spill eater) poate fi folosit in oricare aplicatie sau proces ,unde hidrocarburile sau produse pe baza de hidrocarburi sunt extrase, transportate, rafinate , stocate sau utilizate ca si combustibil sau in procesul de fabricatie.

OSE II este utilizat in rafinarie pentru curatarea apelor de proces contaminate cu petrol in : lagune, conducte, zone de stocare , in care pot aparea scurgeri sau avarii la robineti sau in cazul in care este nevoie sa se curete reziduurile petroliere din tancurile de stocare.

OSE II reduce si elimina flamabilitatea hidrocarburilor rafinate si nerafinate si reprezinta un beneficiu al sigurantei pentru lucrul in rafinarie .

OSE II este un produs sigur cu care se poate lucra ,fara efecte adverse asupra lucratorilor sau a persoanelor din vecinatate; in cazul utilizarii produsului OSE II nu este nevoie de echipament de protectie chimica sau aparate pentru respiratie. Utilizarea produsului OSE II produce in cateva minute de la aplicare ,scaderea fractiilor volatile din hidrocarburile deversate, permitand lucrul ,in zona, in conditii mai sigure.

## **OSE II – PRODUS SIGUR PENTRU BIOREMEDIEREA SCURGERILOR DE PETROL TESTARE STIINTIFICA / ACORDURI DE LA TERȚI**

Începând cu 1989, OSEI Corporation a curățat efectiv mai mult de 20.000 de scurgeri de petrol, ca primă metodă de răspuns pentru curățarea scurgerilor de petrol.

Produsul, Oil Spill Eater II <sup>TM</sup> (OSE II) a fost testat riguros si independent in mod stiintific in toata lumea, fiind distribuit in peste 35 de tari si natiuni.

OSE II este listat (nominalizat) de catre Ministerul Apararii din SUA in baza logistica de aprovizionare si de catre Sistemul Intern Denix al US Navy in documentul BAA Book 18 Nr.14 (Manual de interventii militare pentru marina)

Oil Spill Eater sprijina ,in mare masura , modul natural de bioremediere si este, la nivel mondial, procesul de bioremediere cel mai ieftin, ecologic si sigur pentru descompunerea scurgerilor si a contaminarilor de petrol , indiferent de locatie sau de marimea dezastrului ecologic.

OSE II este un produs ecologic sigur, deoarece utilizeaza bioremedierea naturala a mediului cu efect de eradicare a substantelor periculoase.

OSE II poate fi utilizat ca o prima masura de decontaminare pentru scurgeri recente de petrol, cu curatare imediata.

## **METODA DE ACTIUNE**

Ce se intampla cand produsul OSE II este aplicat pe o scurgere petroliera:

- biosurfactantii ataca structura moleculara a hidrocarburilor, divizand hidrocarburile in parti mici, producand astfel solubilizarea petrolului la nivelul interfetei dintre petrol si apa ,imediat si in aproximativ 30 minute de la aplicare;
- in timpul acestui proces, enzimele ,din produsul OSE II, formeaza legaturi de proteina in zona pe care a fost aplicat si actioneaza ca un catalizator asupra biodiversitatii existente in mediu, care va utiliza hidrocarburile divizate ca sursa de hrana.
- odata ce aceasta reactie are loc cateva aspecte apar in mod evident
  - o hidrocarburile petroliere au legaturile rupte, proprietatile de adeziune sunt diminuate, ceea ce permite ca petrolul sa se indeparteze usor de pe iarba,pietre ,nisip, pamant , vase (vapoare, conducte, bazine, pasari, specii marine (vietuitoare), zonele de plaja si multe altele – sol, apa, plante, animale contaminate din zona afectata)
  - o riscul la foc este redus; acest lucru va proteja personalul de interventie in zona contaminata
  - o petrolul capata flotabilitate si mai mare; acest lucru previne contaminarea secundara a zonelor si distrugerea cantitatii de oxigen existente in mediu – in special in apa de mare sau apa dulce
  - o petrolul este detoxifiat si poate fi utilizat ca sursa de hrana de catre biodiversitatea existenta cu rezultat biochimic al digestiei - CO2 si apa;
  - o in final, aceasta biodiversitate moare dupa ce a descompus si digerat revarsarea de petrol, impiedicand imprastierea zonei contaminate;
- din cauza acestor reactii OSE II apare ca nutrient cu colonizare rapida a bacteriilor indigene (OSE II nu introduce bacterii non-indigene in orice ecosistem; le utilizeaza numai pe cele existente, care apartin sistemului)
- imediat ce bacteriile indigene termina de utilizat nutrientii din OSE II, acestea utilizeaza singura sursa de hrana care a mai ramas – petrolul detoxifiat
- constituentii din produsul OSE II care se amesteca cu apa de lac sau de mare, permit aderarea moleculara a compusului rezultat din apa si OSE II, la hidrocarburile existente in scurgerea de petrol. Din acest punct de vedere nu conteaza daca exista in zona contaminata, in special in apa, curenti sau valuri care imprastie petrolul; produsul OSE II va adera la acesta si va grabi descompunerea naturala.

### **- DEMONSTRATII VIDEO**

Cuvinte cheie “**OSE II OIL SPILL**” pe YOUTUBE

## **TESTAREA EFICACITATII – STUDII STIINTIFICE**

Produsul OSE II poate fi utilizat la suprafata solului, in subsol, pe suprafata oceanului, in mlastini, estuare, pe nisip, pe zone costiere cu pamant sau piatra, in plaje sau porturi. Ample studii de caz sunt disponibile si dovedesc flexibilitatea utilizarii si aplicarii in toate mediile.

OSE II este practic un produs netoxic si eficient in dezintegrarea petrolului.

Va recomandam sa consultati biblioteca tehnica de la OSEI Corporation [www.osei.us](http://www.osei.us) cu testele recente, de mai jos:

### **Teste de eficacitate in apa de mare:**

- U.S. EPA / NETAC 21 Day & 28 Day Bioremediation Test --- Biodegraded Alaskan Crude 98% in 21/28 days. (pg 25---35) –
- U.S. EPA / NETAC 21 si 28 de zile test de bioremediere – biodegradarea petrolului de Alaska in procent de 98% (pag 25 – 35)
- U.S. Respirability Test – EPA determined OSE II to reduce hydrocarbons by 98% and aromatics by 85% which was better than any other product tested. (pg 41---44)
- US test de Respirabilitate – dupa EPA (Agentia de Protectia Mediului SUA) cu determinarea capabilitatii produsului OSE II de a reduce hidrocarburiel in procent de 98% si hidrocarburiel aromatice in procent de 85% cu rezultate mai bune decat oricare alte produse testate (pag 41-44)
- University of Alaska (Dr. Brown) PAH Test – Demonstrates that OSE II with mineral nutrients and hydrocarbons is **300%** more effective than without OSE II. (pg 45---49)
- Universitatea din Alaska (Dr. Browns) PAH Test – demonstreaza ca OSE II impreuna cu nutrientii si hidrocarburiel este cu 300% mai eficient decat fara utilizarea OSE II
- Mega Borg Ship Spill in Gulf (South African Crude Oil) Test – In 216 hours OSE II lowered TPH from 100,070 ppm to 516 ppm for a 99.5% reduction. (pg 50---52)
- Surgerea de la nava Mega Borg Ship in Golf (Petrol SudAfrican) Test – in 216 ore OSE II a scazut TPH (Cantitatea de petrol ca ratie imprastiata in mediu) de la 100070 ppm la 516 ppm cu rezultat de reducere in proportie de 99.5% (pag 50-52)
- BETX Bioremediation Test--- OSE II can even work well on Benzene, EthylBenzene, Toulene and Xylene ratios demonstrate the potential to biodegrade as much as 98%. (pg 53---56)
- BETX Test-de bioremediere-- produsul OSE II poate sa lucreze foarte bine cu benzen, ethil benzen, toluen si xylen cu potential de biodegradabilitate de pana la 98% (pag 53-56)

### **Teste de eficacitate in apa dulce:**

- Chevron Crude Oil Bioremediation Test--- OSE II on Chevron Crude in 24 days reduced 95,200 ppm to 690 ppm or 99.8% effective on biodegrading this oil.
- Test de bioremediere pe titei Chevron – OSE II a fost testat pe titei Chevron cu rezultat de bioremediere in 24 de zile cu reducere de la 95200 ppm la 690 ppm si o ratie de 99.8% eficienta in biodegradarea acestui titei.

### **Teste de eficacitate in sol:**

- U.S. Marine Corps Base 29 Palms California (Cleanup Won Environmental Award) (pg 1---5)
- Baza 29 US Marine de la Palms California (Curatarea cu OSE II a primit premiul de Mediu – pag 1-5)

### **Teste speciale de toxicitate in apa de mare**

- U.S. EPA / NETAC Mysid Toxicity Test (this test was run twice) – LC50 Test, at 96 hours OSE II greater than 2100 mg/L.
- U.S. EPA / NETAC Mysid Test de toxicitate – acest test a facut de 2 ori – test LC50 iar la 96 de ore OSE II este mai mare de 2100mg/l
- Both Mummichog and Artemia Salina Toxicity Test – LC50 Test, at 48 hours OSE II is 5285 mg/L. (pg 14---23)
- Mummichog si Artemia Salina test de toxicitate – test LC50 la 48 de ore OSE II este 5285 mg/l (pag 14-23)

### **Teste speciale de toxicitate in apa dulce**

- Rainbow Trout Toxicity Test by Environment Canada---Toxicity tests state 1000 mg/L or less is toxic. Anything higher is acceptable and considered non---toxic. OSE II, test result 10,000 mg/L = non---toxic.
- Test de toxicitate pe pastra curcubeu efectuat de Agentia de Protectia Mediului Canada – testul de toxicitate indica 1000 mg/l sau mai putin de limita toxica. Oricare valoare mai mare este acceptabila si considerata netoxica . Testul cu OSE II a rezultat 10000 mg/l cu rezultat netoxic.

### **Efecte benefice pentru mediu:**

- Biological Oxygen Demand for OSE II –OSE II has minimal impact on BOD, less than 7%.
- Cantitatea necesara de oxigen in apa (ca cerinta de mediu) – OSE II are un impact minim asupra cantitatii existente (disponibile) in apa: afecteaza un procent mai mic de 7%
- Dispersant Swirling Flask Test --- Proves OSE II causes oil to float
- Test asupra puterii de curatare – OSE II a dovedit ca poate determina desprinderea petrolului de pe toate suprafetele cu care intra in contact.

## DEMONSTRAȚII CU UTILIZAREA PRODUSULUI CONFIRMARI PUBLICE EFECTUATE DE OFICIALITATI AI ADMINISTRATIEI USA

Pentru o prezentare generală din Știrile TV și demonstrații efective, va rugam sa accesati/vizionati:

- **WLOX News** (canal de televiziune american – statul Mississippi) OSEI Corp a facut demonstratii cu produsul OSE II in prezenta senatorilor si membrilor Departamentului de Calitate a Mediului a statului Mississippi. Produsul arata cat de rapid OSE II poate sa rupa si sa dizolve o scurgere de petrol.
- Dupa ce a vazut aceasta demonstratie Senatorul e Mississippi Tommy Gollot a trimis o cerere formala la Paza de Coasta si la Agentia de Protectie a Mediului cu solicitarea de a utiliza produsul OSE II
- Demonstratia la Departamentul de Protectie al Mediului al statului Alabama; reprezentatii departamentului au contactat US Navy pentru a verifica modul de utilizare al produsului OSE II. Rezolutia raportului a mentionat ca "acest produs indeplineste criteriile statului Alabama deoarece nu contine suplimentar un supermicrob; este un proces simplu si nu este nimic magic in desfasurarea lui". Dupa demonstratie, senatorul Hank Erwin a trimis o cerere formala pentru utilizarea produsului OSE II de catre Agentia de Protectie a Mediului
- Demonstratie video la DWH Oil – proprietate privata

### ALTE ACTIUNI

- OSE II a fost utilizat de US Navy in San Diego Bay la peste 100 de scurgeri intr-o perioada de 3 ani jumătate, fara efecte adverse asupra balenelor, delfinilor sau alta parte a mediului marin; OSE II a fost utilizat de toate cele 5 parti (arme) ale armatei SUA
- Echipele Regionale ale Agentiei de Protectie a Mediului au avut 6 interventii de succes cu OSE II in Osage Indian reservation
- BP a utilizat OSE II in Trinidad & Tobago si la o rafinarie in Grecia;
- OSE II a fost des utilizat de catre Centrul Naval de Sanatate a Mediului din Norfolk, Virginia. Dl. Jerry Drewer este contactul nostru. De asemenea, OSE II a fost testat de multe ori de catre Laboratorul de Cercetari Navale din Key West Florida. Contactul nostru este dl. Jan Berge
- Decontaminari cu produsul OSE II sunt disponibile pe youtube; cuvinte cheie OSE II - Oil Spill

### Imagini din Rafinaria Sommerset – Statul Kentucky SUA

<http://osei.us/photoalbums/sommerset-refinery>



## Sample protocols for other refineries below

### Pakistan Zamzama Gas Plant Pit ZAM 07 A

I. Parameters of contaminated site: The site is at the Zamzama Gas Plant In Pakistan. The area of contamination is contained in a sludge pits numbered 06 and 07. This procedure will cover the pit denoted Zam 06. This pit contains 895 m<sup>3</sup> of cuttings/mud. We have been directed that all free floating oil has been removed.

II. Calculations: 895 m<sup>3</sup> ( 145 m<sup>3</sup> of oil based mud, and 750 m<sup>3</sup> of water based mud) X 2.3L equals 2058.5L of OSE II mixed with 205,850 liters of fresh water to mix with OSE II for the 50 to 1 ratio to ensure saturation of the cuttings/mud.

A 2058.5L of OSE II equals, (2058.5 X 0.246172052637296) 543.80 gallons of OSE II or 543.80 divided by 55 (number of gallons in a drum of OSE II) equals 9.80, or 9 drums of OSE II and 44 gallons, since OSE II. Therefore you would take 10, 55, gallon drums of OSE II since the shipping price would be less than purchasing 9 drums and 10, 5 gallon cases of OSE II.

B. NOTE; There are two procedures to address the cuttings in Zam 07. One procedure is to remove the cuttings from the pit and spread it out on plastic, and the other method is to clean up the cuttings in the pit In situ. This procedure, Procedure A, removing the cuttings, and placing them on plastic will be addressed first.

III. Materials needed:

1. 1790 is the actual area needed however to simplify application we will use 2,000 square meters of area to spread out the cuttings/mud

2. 10, 55 gallon drums of OSE II

P2 Zamzama Gas Plant Pit ZAM 06 A

3. Enough plastic to cover 2000 square meters

4. 400, 1 meter wooden stakes

5. Enough string to form a grid with the wooden stakes

6. An inexpensive soil, or lawn moisture meter

7. Excavation machine to build a berm around treatment area, and to relocate cuttings/mud from the pit to the plastic

8. A water tank truck that can suck up water, and discharge water, with the ability to mix OSE II with the water in the water tank truck. The tank should hold, either 50,000 liters of water. The water tank/truck will need a flow meter or you will need to be able to calculate number of liters per minute discharge rate. The tank will need a minimum length of hose to be 10 meters

9. A source to collect 205,850 liters of water

10. A machine to till the cuttings/mud

11. 10 laboratory jars with sealed caps

12. Markers to designate sealed laboratory jars

13. Ice chest to store samples while being transported to the laboratory

14. a small hand shovel or soil extraction device to extract samples of cuttings

15. Soil marking paint for berm area

16. Long tape measure

17. Duct tape

18. A long handle paddle

#### IV. Procedure:

1. Using wooden stakes mark out a line 2,000 meters apart.
  2. Take marking paint and spray approximately a 50 centimeter line every 5 meters. Make a right or left 90 degree turn and set another stake 2,000 meters from the first corner stake. Then spray approximately a 50 centimeter line every 5 meters, then turn right again and set another stake 2,000 meters from the second corner stake. spray approximately a 50 centimeter line every 5 meters. Then turn right 90 degrees again and the fourth stake will already be there completing the square. spray approximately a 50 centimeter line every 5 meters.
  3. Using the excavation machine place the clean dirt up next to the painted marked line, build the soil up at least 60 cm in height.
  4. Rollout the poly---ethylene plastic starting at one end covering up the berm, on one side. Place a stake every 20 meters through the outside edge of the poly to keep it in place and for application purposes later. Make sure when you roll out the rest of the plastic it overlaps, and you can use duct tape in spots to make sure the plastic stays in place. Make sure you overlap the plastic by at least 40cm for a good seal.
  5. Using the excavation machine place the 895 m<sup>3</sup> of cuttings/mud onto the plastic and spread the cuttings to a depth of approximately 50 cm.
  6. Roll out the string from one stake to the stake directly across from it and tie off the string on both stakes. Do this until the string has formed a 20 m<sup>2</sup> X 20 m<sup>2</sup> grids for the entire treatment area.
  7. Note: each grid will contain 20m<sup>2</sup> X 20 m<sup>2</sup> X 50 cm of cuttings/mud. Each grid will have approximately 200 cubic meters of cuttings/mud. Each grid will receive. 200 m<sup>3</sup> X 2.3 liters of OSE II mixed, or 460 liters of OSE II, with 100 liters of water for each liter of OSE II for a total of 46,000 liters of OSE II mixed with water. You can use more than one truck to expedite the OSE II and water application.
  8. The tank will extract 45540 liters of water from a fresh water source, and then 460 liters of OSE II will be added to the water tank and mixed with the long handle paddle.
  9. The OSE and water mixture tank will be staged in such a place so the hose will cover the entire grid. OSE II will then be applied as evenly as possible through out the grid. Repeat steps 7, 8, and 9 until all the grids have had OSE II applied to them
- Note the extra OSE II from 9 drums 44 gallons to 10 drums will be used to make up for the extra grid area using the 2,000 m<sup>2</sup> instead of 1790 m<sup>2</sup>. This makes application and calculation on the job easier.

#### V. Test requirements

1. Based on the contaminant levels and the type of contaminant you should extract the first samples from the soil 15 days after the application of OSE II. Extract samples from 10 different sampling areas, mark the areas with a stake, mix the samples to form a composite sample, seal the lids, place on ice in the ice chest, and transport to the lab for analysis.
2. repeat the steps in 1 above on day 30
3. If needed repeat the steps from one above on day 45
4. Once the site is deemed clean reuse the now very fertile soil anywhere

#### VI. Site maintenance:

1. Two days after applying OSE II to the cuttings/mud use lawn moisture meter and measure the water/moisture level of the soil in several places. If the moisture level is below 30% add enough fresh water from the same place water was used to mix with OSE II and bring the moisture level up to 30%.
2. Twice a week use tilling machine to till or turn the cuttings/mud over.
3. On the same days the cuttings/mud is tilled measure the cuttings/mud moisture level with the lawn moisture meter. If the level falls below a 30% moisture level add the same fresh water used to mix OSE II to the cuttings/mud. Measure the moisture in several areas to make sure the cuttings/mud is saturated with water. You cannot add too much water, however you do not want to overflow the berms. Rain is good for remediation as well

VII. Observations:

1. Make note of any changes in color after applying OSE II, any odor changes, and any other pertinent visual observations, especially any noticeable changes.
2. Each time the cuttings/mud is tilled and or water added make notes of any observations.

VIII. Expected results/Conclusion:

1. Based on the levels and types of contaminants the levels of the hydrocarbons will be close to the acceptable range by day 30. The cuttings/mud will be rich garden compost upon completion of the clean up.

Engineered by Wilfred Aghoghovbia  
Steven Pedigo

## **Iraq, Reliance Exploration and production Refinery clean up**

### **I. Parameters of contaminated site:**

Contaminated site has a pit 36m x 34m X 2.5m with oily sludge located in Kurdistan N. Iraq owned by Reliance Exploration and Production DMCC. The pit contains oily water/oily sludge/soft soil cuttings/ hard cuttings with sludge, with a volume of 1000m<sup>3</sup>. The pit is lined with a Geo membrane and is intact. There are no power outlets.

### **II. Calculations:**

The 1000m<sup>3</sup> of sludge/soil. The pit has a total volume potential of 36m X 34m X 2.5m equals 3,060,000 liters of liquid volume.

1. The sediment/sludge/cuttings volume of 1000m<sup>3</sup> will require (2.3 liters of OSE II per 1m<sup>3</sup> of soil) 1000 X 2.3 equals 2,300 liters of OSE II for the sludge/drilling mud/cuttings.

A. The required OSE II is: 2,300 liters equals 607.6 gallons, or 11.04 drums, or 11, 55 gallon drums and 1, 5 gallon case.

B. 11 drums

C. 1, 5 gallon case

D Total cost of OSE II

2. You will need 115,000 liters of water initially drawn from a fresh water source, no tap water.

A. The total volume of OSE II and water to apply will be 117,300 liters.

B. For a 25,000 liter truck/tank you will need to refill it 4.69 times.

### **III. Materials needed:**

Note; the area in the pit that is 36m X 34m will be used to spread the 1000m<sup>3</sup> of sludge and sediment as evenly as possible.

1. OSE II 11, 55 gallon drums and 1, 5 gallon case.
2. 30 wooden stakes just to anchor the string for a grid purposes.
3. 300 meters minimum of string to tie to the stakes.
2. A water tank truck that can suck up water, and discharge water, with the ability to mix OSE II with the water, in the water tank truck. The tank should hold, 25,000 to 50,000 liters of liquid. The water tank/truck will need a flow meter on the hose or on the nozzle, or you will need to be able to calculate number of liters per minute discharge rate. The tank will need a minimum length of hose to be 20 meters and the spray will 18m, or you will have to get into the pit to apply OSE II.
3. A source to collect 115,000 liters of water initially.
4. A means to spread soil out as evenly as possible, a small front end loader that can go into the pit, or a large backhoe that can spread soil from the sides of the pit.
5. A machine to till or turnover the soil.
6. Soil lawn moisture meter
7. small spade to collect soil samples.
8. 60 polyethylene bags that will hold 500gm each, and 6 bags that will hold 2500gm.
9. label for bags to designate where sample came from and the date collected.
10. Long tape measure
11. Long handle paddle to mix OSE II in tank.
12. Ice chest to carry samples to the lab: you will need to place ice in the chest thirty minutes minimum before extracting samples.
13. Pad and pen or pencil.

### **IV. Procedure: The equipment should be staged at the site at least 24 hours before starting the project.**

1. Spread the mud/sludge/cuttings to a as evenly as possible over the entire 36m X 34m area in the pit. Once the soil is spread use the stake layout document for test extractions to set the 9 stakes no farther than 10 m apart per the specifications in the bid request. This is where the samples for test extractions will be carried out. See stake extraction layout document attached. Number each stake once they are laid out.

2. A. extract 400gm samples from each of the 9 designated areas next to the stakes from 25cm below the surface of the mud, and place into sterilized polyethylene bags.

B. Take 200 gm from each bag and mix it together in a single bag and stirr the mixture until it is homogeneous, there will be a total of 1800gm in the bag.

C. Then put the bag on ice in the ice chest and take to the laboratory, and have an EPA 8527 TPH (Total Parts Hydrocarbon) test performed or an EPA modified 8015 TPH test performed or whatever is required.

3.. Use the grid layout with strings document to lay out the string with stakes tied to each end to anchor them, and push them into the ground on the outside of the pit.

4.. You will have made a grid of 34m X 12m to help with the actual application of OSE II.

5. We will designate for now a 25,000 liter truck/tank, this can be adjusted once we know the actual size of the truck/tank. You will extract 24,500 liters of fresh water into the

truck/tank. This water must be fresh water from a well, creek, river or lake. You will then add 500 liters of OSE II into the tank, and stir the tank with the long handle paddle.

6. Each 34m X 12m grid will contain 333.3m<sup>3</sup> of mud, so each grid will receive 1liters of the OSE II and water mixture from the tank. So when the flow meter on the hose or nozzle reads 105 liters, you will move to the next grid, and apply a 105 liters to that grid until you have finished. You will repeat this until the truck/tank is empty, and then refill the truck/tank with another 24500 liters of fresh water, and 500 liters of OSE II. Spray as evenly across the grid as possible starting in the middle and working out to each side. This will be repeated 4 times.

7. The last time the truck/tank will be filled, it will require 15,000 liters of fresh water and 300 liters of OSE II. Spray as evenly as possible across the grid.

8. Pull the strings up, you will no longer need them.

## **V. Test requirements;**

### **1. On Day 0 once the mud/cuttings/ sludge is spread out .**

A. extract 400gm samples from each of the 8 designated areas near each stake from 25cm below the surface of the mud, and place into sterilize polyethylene bags.

B. Take 200 gm from each bag and mix it together in a single bag and till the mixture is homogeneous, there will be a total of 3200 gm in the bag.

C. Then put the bag on ice in the ice chest and take to the laboratory, and have an EPA 8527 TPH (Total Parts Hydrocarbon) test performed or an EPA modified 8015 TPH test performed.

### **2. On Day 15**

A. extract 400gm samples from each of the 9 designated areas near each stake from 25cm below the surface of the mud, and place into sterilize polyethylene bags.

B. Take 200 gm from each bag and mix it together in a single bag and till the mixture is homogeneous, there will be a total of 3200 gm in the bag.

C. Then put the bag on ice in the ice chest and take to the laboratory, and have an EPA 8527 TPH (Total Parts Hydrocarbon) test performed or an EPA modified 8015 TPH test performed.

### **3. On Day 30**

A. extract 400gm samples from each of the 8 designated areas near each stake from 25cm below the surface of the mud, and place into sterilize polyethylene bags.

B. Take 200 gm from each bag and mix it together in a single bag and till the mixture is homogeneous, there will be a total of 3200 gm in the bag.

C. Then put the bag on ice in the ice chest and take to the laboratory, and have an EPA 8527 TPH (Total Parts Hydrocarbon) test performed or an EPA modified 8015 TPH test performed.

### **4. On day 45**

A. extract 400gm samples from each of the 8 designated areas near each stake from 25cm below the surface of the mud, and place into sterilize polyethylene bags.

B. Take 200 gm from each bag and mix it together in a single bag and till the mixture is homogeneous, there will be a total of 3200 gm in the bag.

C. Then put the bag on ice in the ice chest and take to the laboratory, and have an EPA 8527 TPH (Total Parts Hydrocarbon) test performed or an EPA modified 8015 TPH test performed.

5. On day 60

A. extract 400gm samples from each of the 8 designated areas near each stake from 25cm below the surface of the mud, and place into sterilize polyethylene bags.

B. Take 200 gm from each bag and mix it together in a single bag and till the mixture is homogeneous, there will be a total of 3200 gm in the bag.

C. Then put the bag on ice in the ice chest and take to the laboratory, and have an EPA 8527 TPH (Total Parts Hydrocarbon) test performed or an EPA modified 8015 TPH test performed.

6. On Day 75 IF NEEDED

A. extract 400gm samples from each of the 8 designated areas near each stake from 25cm below the surface of the mud, and place into sterilize polyethylene bags.

B. Take 200 gm from each bag and mix it together in a single bag and till the mixture is homogeneous, there will be a total of 3200 gm in the bag.

C. Then put the bag on ice in the ice chest and take to the laboratory, and have an EPA 8527 TPH (Total Parts Hydrocarbon) test performed or an EPA modified 8015 TPH test performed.

#### **VI. Site maintenance:**

1. Twice a week you will need to go to the site and till or turnover the mud, and add water to maintain the 30 % moisture. This will be determined by sticking the moisture meter into the soil at least 10 cm under the surface in several spots in the pit. You do not have to maintain this exactly, more water is good, even if you have a slight layer of water that sets on the surface, you just want to prevent the moisture level from going below 30% if possible. Rain is acceptable.

#### **VII. Observations**

1. You will write down the observations noting all the parameters of the site before you start including smells. You will do this after each step in the procedure, and after each time you visit the site and perform tilling/turning over the soil, and or, adding water for moisture level..

#### **VIII. Expected results/Conclusion**

1. The drilling mud/cuttings/sludge should be remediated in 30 to 45 days, and at the most 60 days.

#### **IX. Labor**

**1. You could get away with 2 laborers, however 3 would be more than enough on the in initial day. The twice a week maintenance could be handled by one person, however if there are two and an accident occurs then there would be someone there to call for help!**

Protocol performed by Chace Smith, and Robert Pedigo

If you are interested in OSE II let us know, or if you have a project that needs addressed send us the all the parameters and we will develop a step by step protocol to remediate your refinery contaminant.

# ***EU Safety Data Sheet***

Issued: June 1, 2015

**See #2 for CAS Numbers OIL SPILL EATER II**

## **1. IDENTIFICATION OF THE SUBSTANCE PREPARATION AND COMPANY**

Product Name:	Oil Spill Eater II, OSE II
Product Code:	
(Export Code)	3821000000
Product Type:	Hydrocarbon Bioremediation Product
Supplier:	Oil Spill Eater International Corporation

## 2. COMPOSITION INFORMATION ON INGREDIENTS

Preparation Description: A hydrocarbon bioremediation product containing all natural nonhazardous ingredients. Contains: CAS

Ingredient		CAS Number
1) Water	80-90%	7732-18-5
2) Nitrogen (Urea)	0.01-0.09%	57-13-6
3) Molasses	1-2%	None
4) Bio Surfactant	0.06-0.08%	68131-40-8
5) Sugar	1.5%-2%	50-99-7
6) Protease	0.01-0.03%	9014-01-1
7) Amylase	0.01-0.03%	9000/90/2
8) Malt	1-2%	8029-43-4

Dangerous Components/Constituents: None

## 3. HAZARDOUS IDENTIFICATION

**A. OSE II is not GHS controlled, does not contain hazardous or regulated ingredients**

**B. OSE II is not REACH registered, OSE II does not contain any hazardous or regulated ingredients**

Human Health Hazards: None. Potentially toxic if more than 1 liter ingested.

Safety Hazards: Will not burn. Is, in fact, a fire retardant.

Environmental Hazards: None. Protects environment; 100% biodegradable; no known allergens.

## 4. FIRST AID MEASURES

Symptoms and Effects: Prolonged exposure would have minimal effect, if any at all.

First Aid - Inhalation: Inhalation of vapors from this product pose no acute or chronic hazard.

First Aid - Skin: Prolonged exposure to skin may cause some drying of the skin. Wash off with water.

First Aid - Eye: Flush eyes with copious quantities of water. If irritation persists, seek medical attention.

First Aid - Ingestion: If less than 59 ml or 2 ounces is ingested, no toxic symptoms should occur, to most humans. Wash out mouth and seek medical attention if more than 59 ml or 2 ounces *is ingested*.

Advice to Physicians: Treat symptomatically. Wash skin or eyes thoroughly. Treat as you would for any large ingestion of mild soap or tooth paste.

## 5. FIRE FIGHTING MEASURES

Specific Hazards: OSE II is a fire retardant. However, if applied to a burning fire, there can be a slight flash before fire goes out.

Extinguishing Media: None required. Product is a fire retardant. Method - ASTM-D56.

Unsuitable Extinguishing Media: None required. Product is a fire retardant.

Protective Equipment: Proper protective equipment including breathing apparatus must be worn when approaching any fire.

## 6. ACCIDENTAL RELEASE MEASURES

Personal Precautions: Avoid contact with eyes. Wash from skin or eyes as needed.

Personal Protection: Wear goggles if applying in windy conditions. Wear protective rubber gloves if applying directly in a prolonged situation.

Environmental Precautions: Wash down with water. Will help clean soil, drains, or water.

Clean-up methods - small spillage: Wash down with water. Non-toxic to the environment.

Clean-up methods - large spillage: Same as for small spills.

## 7. HANDLING AND STORAGE

Handling: When handling product in drums, safety footwear should be worn. However No special handling procedures required.

Storage:	Keep in cool, dry area. Avoid direct sunlight and excessive heat.
Storage Temperatures:	Do not store where temperature exceeds 120 F.
Recommended Materials:	Polyethylene drums or PVC are acceptable.
Unsuitable Materials:	None known.
Other Information:	Product can freeze / thaw without any negative effect on product.

## 8. EXPOSURE CONTROL/PERSONAL PROTECTION

Occupational Exposure Standards:	None established (none toxic).
Hygiene Measures:	Wash hands before eating or drinking.
Respiratory Protection:	Not normally required.
Hand Protection:	Any plastic or rubber glove if needed; not normally required.
Eye Protection:	Wear safety glasses or goggles if applying in windy conditions.
Body Protection:	Not normally required.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Liquid with the same density of H <sub>2</sub> O.
Color:	Amber to brown
Odor:	Some smell of ferment.
Vapor Pressure:	Same as H <sub>2</sub> O. 1.0215
Density:	Same as H <sub>2</sub> O. 1.0215
Vapor Density:	Same as H <sub>2</sub> O. 1.0215
Dropping Point:	Same as H <sub>2</sub> O.

Flash Point:	Same as H <sub>2</sub> O in excess of 7000° F.
Flammability Limit - Lower:	Nonflammable.
Flammability Limit - Upper:	Nonflammable.
Auto-ignition Temperature:	Non-igniting
Solubility in Water:	100%
N-octanol/water Partition Coefficient:	100% soluble - non partitioning None.
Elements Content:	

## 10. STABILITY/REACTIVITY

Stability:	Stable.
Conditions to Avoid:	Temperatures in excess of 120° F and direct sunlight during storage or transporting.
Materials to Avoid:	Strong oxidizing agents.
Hazardous Decomposition Products:	None decomposes to CO <sub>2</sub> and H <sub>2</sub> O.

## 11. TOXICOLOGICAL INFORMATION

Basis for Assessment:	Toxicity tests have been performed Determining OSE II is (virtually nontoxic).
Acute Toxicity - Oral:	2 oz or 60 ml has been ingested with no harm
Acute Toxicity - Dermal:	None.
Eye Irritation:	Slight irritant alleviated by copious eye washing.
Skin Irritation:	Skin can dry slightly if prolonged direct exposure occurs.
Respiratory Irritation:	Virtually none.
Skin Sensitization:	Not expected to be a skin sensitizer.
(Sub )chronic Toxicity:	None expected.
Carcinogenicity:	Not a carcinogen.

Mutagenicity:	Not a mutagenic.
Human Effects:	None expected.
Other Information:	Not applicable.

## 12. Ecological Information

Basis for Assessment:	Ecotoxicological data has been determined specifically for this product. Information given is for specific sensitive (aquatic) species in fresh and salt water.
Mobility:	Liquid that floats on water and solubilizes rapidly. If it comes in contact with soil will percolate at the same rate as H <sub>2</sub> O and will biodegrade rapidly.
Persistence/Degradability:	Product completely biodegrades in water or soil environments and will not persist. 100% biodegradable as testing has confirmed
Bioaccumulation:	None
Ecotoxicity:	100% soluble.
US EAP	<b>LC50 Brine shrimp:</b> >1,900 mg/l up to 10,000 mg/l. <b>LC50 Fundulus Heterocletus</b> 96 hour: 5,258 mg/l.
Environment Canada	<b>LC50 Rainbow Trout:</b> 10,000 mg/l.
OSEI with the city of Plano Tx	<b>LC50 Fathead Minnows</b> (Pimephale promelas): 9,300 mg/l.
Australia NATA test results:	<b>IC10(milky oyster, Saccostrea echinata):</b> 11.0 (10.0-11.9)mg/l/48h <b>EC50(milky oyster, Saccostrea echinata):</b> 16.5 (16.0-17.1)mg/l/48h <b>NOEC(milky oyster, Saccostrea echinata):</b> 10.0mg/l

**LOEC(milky oyster, Saccostrea echinata):**  
20.0mg/l

**EC10(mussel, Mytilus galloprovincialis):**  
>20.0mg/l/72h

**EC50(mussel, Mytilus galloprovincialis):**  
>20.0mg/l/72h

**NOEC(mussel, Mytilus galloprovincialis):**  
20.0mg/l

**LOEC(mussel, Mytilus galloprovincialis):**  
>20.0mg/l

### 13. DISPOSAL CONSIDERATIONS

Waste Disposal:	No special disposal.
Product Disposal:	No special disposal.
Container Disposal:	No special disposal.
Local Legislation:	Not applicable.

### 14. TRANSPORT INFORMATION

Not dangerous for conveyance under UN, IMO, ADRiRID.

Marine Transport (IMO/IMDG): Not classified as Dangerous Goods by the criteria of the International Maritime Dangerous Goods Code (IMDG Code) for transport by sea.

Air Transport (ICAO/IATA): Not classified as Dangerous Goods by the criteria of the International Air Transport Association (IATA) Dangerous Goods Regulations for transport by air.

**IMDG Marine No**

## 15. REGULATORY INFORMATION

**GHS** not controlled, does not contain hazardous or regulated ingredients

**REACH** Not registered, OSE II does not contain any hazardous or regulated ingredients

EC Classification: Not known.

EC Symbols: Not known.

EC Risk Phrases: Not known.

EINECS (EC): Not known.

TSCA (USA):

Other Information: US DOT class 55 non hazardous

Dangerous

Constituents: None.

## 16. OTHER INFORMATION

Only bioremediation product successfully used to permanently remove oil on U.S. navigable waters under U.S. EPA Government observation.

**Government approvals or approved listings:**

US EPA NCP # B53,  
New Zealand EPA SOS #  
1001797, Australia #OBA  
Oil Spill Control agent Greek registration ID  
no:17554  
Gulf States MEMAC approval Ref:337/12-  
RHD,  
Philippine accreditation #PCG-14-06-112  
Nigeria NOSDRA cert: 189,  
Mexico Coatzacoalcos.Ver.,a 30 de Julio  
de 2014,  
Israel approval,  
UK approval #ODA 241/2015 , Trinidad and  
Tobago approval# MEEA:12.1.5 Vol.  
XXXXII, South Korea cert no: S-007

Uses and Restrictions: Bioremediation product that converts hydrocarbons, chlorinated hydrocarbons, and most organic based material or waste to CO<sub>2</sub> and H<sub>2</sub>O.

### **Literature References**

SDS Created: June of 2015

Preparation of Safety Data Sheets for Hazardous Chemicals Code of Practice. Standard for the Uniform Scheduling of Medicines and Poisons. Australian Code for the Transport of Dangerous Goods by Road & Rail. Model Work Health and Safety Regulations, Schedule 10: Prohibited carcinogens, restricted carcinogens and restricted hazardous chemicals. Workplace exposure standards for airborne contaminants, Safe work Australia. American Conference of Industrial Hygienists (ACGIH). Globally Harmonised System of classification and labelling of chemicals. ...End Of MSDS...

### **STORAGE**

OSE II has a shelf life of 5 years then the effectiveness goes down 10 percent a year after the 5 years. Try to store the product out of direct sunlight. You can store it in bottle or sealed drum once you open drum you can close it back up and the product be fine.

## REFERENCES

Recent 150,000 gallon, or 550,000 liter clean up with OSE II in Nigeria see link <http://osei.us/wp-content/uploads/OSEI-Nigeria-AGIP-Brass-Terminal-Clean-up-complete-data-set-4-14-14-.pdf> also see video at link <http://osei.us/archives/1519>

See these video links

Dubai [https://www.dropbox.com/s/0q9bl9238qqxq2g/IMG\\_2325-1.MOV](https://www.dropbox.com/s/0q9bl9238qqxq2g/IMG_2325-1.MOV)

Arabian Gulf at link <http://youtu.be/QUoytcFq9Z8>

Shell oil test showing how effective OSE II is at link [http://osei.us/wp-content/uploads/Nigeria\\_Shell\\_testing\\_OSE\\_II](http://osei.us/wp-content/uploads/Nigeria_Shell_testing_OSE_II)

Argentina tank bottoms clean up <http://osei.us/wp-content/uploads/ArgentinaGreencorheavyoilTank-201302.pdf>

EPA test on waste oil <http://www.osei.us/pdf%20files/RRT%20plus%20testing.pdf>

18 toxicity test proving OSE II is non toxic <http://osei.us/wp-content/uploads/18-Toxicity-test-with-4-2012-Log0.pdf> Higher the number the less toxic, OSE II 's average number is 1900 ppm and above the US EPA has set the standard as non toxic the number has to be above 100 ppm.

See OSHA letter showing OSE II is safe for responders and your employees [http://osei.us/tech-library-pdfs/2011/9-OSEI%20Manual\\_OSHA.pdf](http://osei.us/tech-library-pdfs/2011/9-OSEI%20Manual_OSHA.pdf)

The attachment entitled economic comparison will show you why OSE II can save money on spill response cost, and natural resource damages.

US EPA complete NCP listing information, as well as the US EPA notebook information for OSE II with test results, and general instructions see link <http://osei.us/ncp-listing-information-and-disclosures>

Comparing OSE II to dispersants

[http://protectmarinelifenow.org/wp-content/uploads/delightful-downloads/2015/03/LAEO-Call-for-a-Twenty-First-Century\\_Soluiton\\_in\\_Oil\\_Spill\\_Response\\_Update.pdf](http://protectmarinelifenow.org/wp-content/uploads/delightful-downloads/2015/03/LAEO-Call-for-a-Twenty-First-Century_Soluiton_in_Oil_Spill_Response_Update.pdf)

2. Link to multiple documents: <http://protectmarinelifenow.org/knowledge-base>

## **OSEI Soil clean up demonstration for 2 cubic meters of soil with OSE II**

### **II. Calculations: 1.9 m<sup>3</sup> of soil contaminated with 10,000 to 50,000 ppm of hydrocarbons/oil/fuels or less.**

1. Each cubic meter will require 20 liters of OSE II for a total of OSE II ( 20 X 2 m<sup>3</sup> = 40 liters)
2. Each liter of OSE II requires mixing with 25 liters of fresh natural water if fresh natural water is associated with the site or 25 liters of salt water if near the ocean or is tidally influenced, or brackish water if that is what the site is associated with. The total liters of water will be 500 liters to mix with 20 liters of OSE II.

### **III. Materials needed: NOTE if clean up will be in situ then disregard the instructions to build a cell and lay out soil on top of soil instead, or just apply to soil in place.**

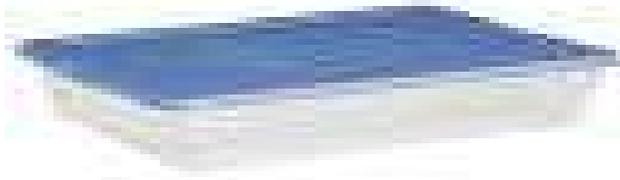
1. 40 liters of OSE II
2. A water tank with a hose and a spray nozzle that can put out a wide spray, tank should hold 1500 liters of water, pump should contain a means to pull in water, and discharge water. Tank will be needed to add the same water used to mix OSE II in order to maintain a 60% moisture level in the soil.

## **OSE II How-To Soil Demonstration Illustrated**

### **I. Required Items to perform test/demonstration**

**A. CONTAINER:** You need a container that is approximately 24 inches long by 18 inches wide, by 6 to 8 inches deep.

Plastic container from Home depot for 5.99\$ US



This container is 23 inches by 16.25 inches by 6 inches in height  
<http://www.homedepot.com/p/Sterilite-28-qt-Storage-Box-16551010/100671079#>

**B. SOIL:** You will need enough soil to spread to a depth of 4 inches covering the entire bottom of the plastic container. 23 X 16.25 X 4 inches of soil. This amount of soil is 0. 0473 cubic yards, or 1.2771 cubic feet.



Note you can collect soil with oil already present, and, if so, this would eliminate the need to apply oil to soil in the plastic container. If contaminated soil is not present, the regular soil will do.

C. CRUDE OIL: A half gallon or 64 ounces of crude oil.

Or you may use used motor oil, diesel or gasoline, any hydrocarbon based compound.

D. WATER: There are three options for water to use, fresh, brackish (mix of salt and fresh water), or sea water. The water must be from an unpolluted natural water source. The water you choose will be used to *maintain a soil moisture level of 30% or more* and will be from the same source of water used when, at the beginning of the test, you mix OSE II with water to apply it to the oiled soil.

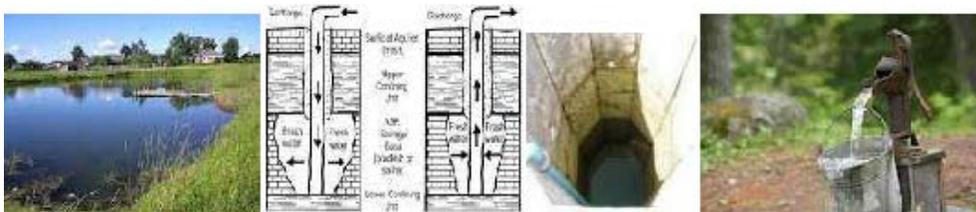
Note: The reason one uses a native source of water is because OSE II activates the oil eating microbes naturally present in the water. If an oil spill took place on a river, or pond, lake, inlet, marsh, bay etc. you would use the water in THAT SPILL LOCATION. If you were to use tap water, OSE II would not show a result or a very slow one because tap water is treated, it contains very little if any bacteria and has been treated/purified using chemicals. Because OSE II contains no microbes but instead works WITH the oil eating bacteria/microbes living in their native environments, your demonstration soil and water will need to approximate natural conditions as much as possible.

**Examples of usable water sources:**

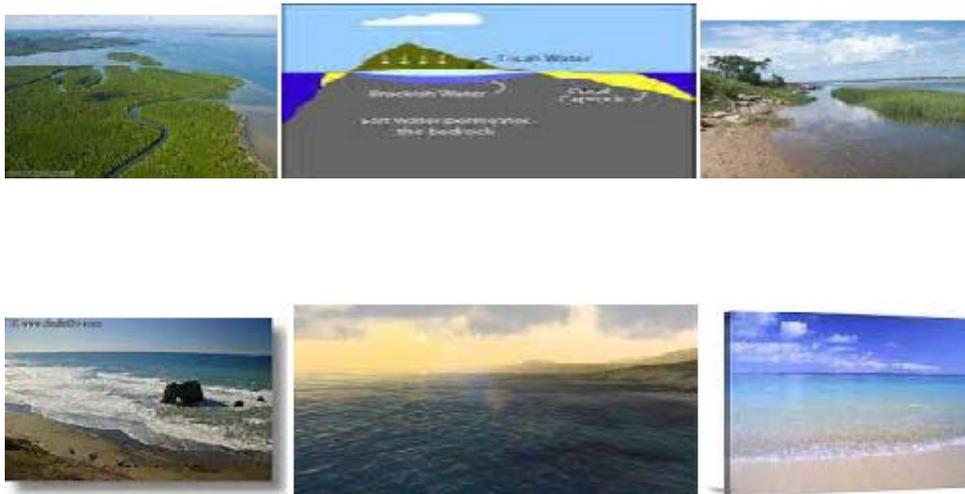
**Fresh Water Lake, then a river, and a stream**



**Fresh water pond or well**



**Brackish water (where fresh water meets ocean/sea water)**



**Ocean or sea water**

**Water can be collected in pails or bottles. Collect at least 2 gallons before starting the demonstration, and start the aeration within an hour after first applying OSE II. You should use the water within an hour of collecting it, if possible. Mechanical aeration is not needed if you are going to replace the water each day.**



**Refreshed Water:** If you do not replace water daily, you will need aerator the water and refresh the water in the pails or bottles at least every three days. Ideal conditions would be new everyday if possible.

**E. AERATOR:** If you cannot refresh the water everyday then you will need a small aquarium aerator with a plastic tube to keep the water oxygenated



**F. SMALL GARDEN TOOLS/SPATULA:** You will need small utensils/garden tools to turn the soil. Ensure they are clean and free of contaminants such as pesticides etc.



**G. SAMPLE COLLECTION JARS:** You will need at least 4 Teflon sealed glass jars to take samples to the lab. (Consult with your lab if necessary to ensure you do not use contaminated jars) **The laboratory you use for testing may supply these or may tell you where to procure them. The lab will also tell you the amount of soil they will need to perform a test; this varies between laboratories, so request this information before starting the demonstration. You will also need stick on labels for the jars.**



**H. A spoon** or similar implement to mix the samples together when placed in a jar.

**I. JAR LABELS:** Stick-on labels for the jars.

**J. ICE CHEST:** You will need a small ice chest to take samples to the laboratory. An Hour before placing a sample extraction in the ice chest place ice in the ice chest to cool the temperature down inside the ice chest.



**K. Optional-GLOVES:** Surgical gloves are not required when testing with crude oil since OSE II can wash it off, however if hazardous waste (such as PCB's or pesticides etc.) is being tested, surgical gloves will be necessary.

**L. OSE II:** An 8-ounce bottle of OSE II for a test when you apply oil to the soil. However, if you extract soil that has already been oiled, then you will need to perform a lab test to see



what the concentration of oil is, so the amount of OSE II required can be calculated.

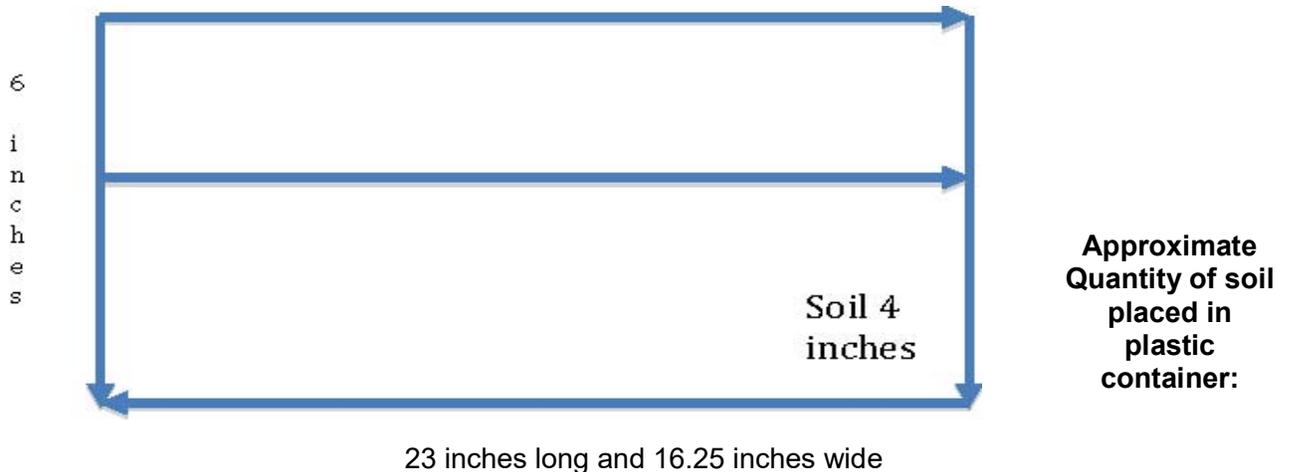
M. MOISTURE METER: You will need a lawn moisture meter, they are easily procured from most hardware stores and are very economical, generally around 10.00\$ US or less.

N. MIX/APPLICATOR TOOLS: you will need a pale or sprayer to mix and apply OSE II to the oil on the soil.



O. LOG BOOK: A log book to keep track of what is done each day and any changes observed.

## II.CALCULATIONS/PROPORTIONS



1. 1 cubic feet of soil can contain 10% by volume of oil, if you are testing sludge or heavily oiled soil then you will need to determine the concentration of oil and apply OSE II based on a 50 to one ratio, the more oil the more OSE II will be required 1 cubic feet contains 7.48 gallons, we suggest you use clean soil and add the recommended oil for the first test.
2. You will need to use 3 ounces of OSE II from the 8-ounce bottle as the minimum required for any test.
3. The water to OSE II dilution ratio required is 50 parts water to 1 part OSE II. 50 times 3 ounces equals 150 ounces of water that you will need to mix with 3 ounces of OSE II.
4. You will need at least a half gallon of water on standby to maintain the moisture level if you are going to supply water each day. For each day you do not resupply water you will need the availability of a half gallon, in other words if you recharge the water every three days you will need 3 times a half gallon or 1 and a half gallons of water when you recharge it.

**REMEMBER:** The soil must be kept at a minimum of 50% moisture level throughout the entire test. If the soil is allowed to dry out during this time, you will not achieve the results as the necessary microbes will die.

**NOTE:** If you start your demonstration/test using fresh water then mix OSE II with fresh water and use the same fresh water source to maintain the moisture level, if you use sea water or brackish water then use sea water or brackish water to maintain the moisture level

**III. DOCUMENTATION & PROCEDURE:** Take pictures or video of each step and keep a log/record with date/times of all actions carried out for the duration of the demonstration.

1. Get all the supplies, oil, water and containers required to perform the demonstration staged at a site that will allow easy access for the demonstration.

2. Add ice to the ice chest for the first set of samples.

3a. If soil is not oiled, take the extracted clean soil and cover the entire of the plastic demonstration container to a depth of approximately 4 inches

3b. Add 3 ounces of crude oil or another hydrocarbon based fuel and apply oil evenly across the soil and let it permeate the soil like a spill would in nature. **DO NOT MIX** oil in the soil, let it permeate a minimum of 30 minutes before taking the first initial sample.

4. TAKE YOUR INITIAL SAMPLE (s) of oiled soil near the surface of the soil without OSE II so that you will have a measurement of oil volume before the application of OSE II.

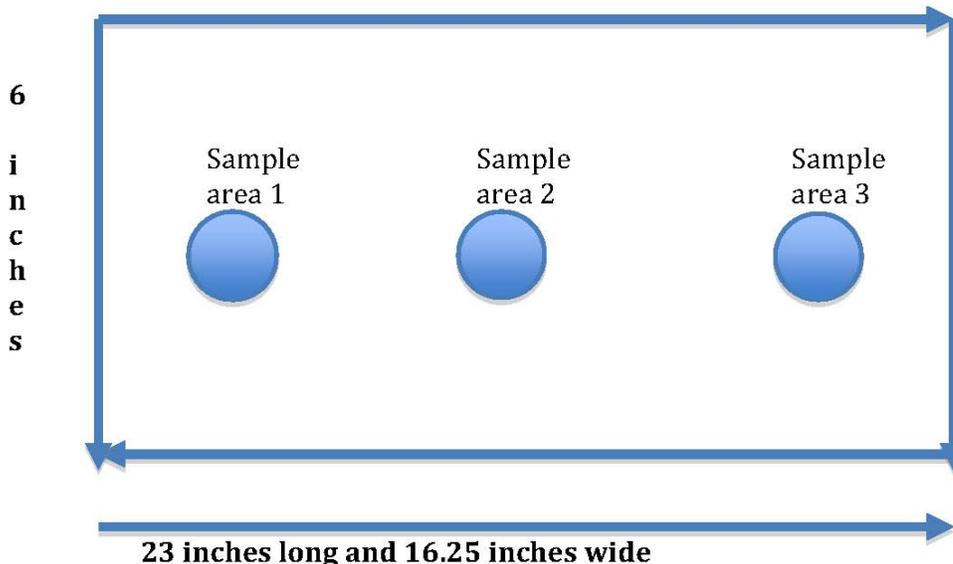
**TWO OPTIONS OF METHODS FOR SAMPLING:**

- a. **COMPOSITE SAMPLING:** Extract a sample of the oil-contaminated soil from 3 different points in the middle of the container per the laboratory requirements. Place the three samples in a single jar, mix the samples, seal the lid and label the jar. Place the sample jar in the ice box for delivery to the lab for analysis. This *mixed sample* from three sample locations is called *composite sampling*.

**NOTE:** Size of Sample varies based on the LAB you are using. An example of one LAB instruction in Los Angeles: “extract 1.3 ounces from each extraction point for a total of 4 ounces and place it in jars, mix and seal, put on ice.” Consult directly with the lab you are using for their required sample size.

- b. ‘THREE SAMPLE STANDARD’: This method while *scientifically valid* is more costly as a standard and may not be required depending on the purpose of your demo/test plan. Where this method is selected or required, each of the three sample extractions are not be mixed, but each is kept separate and placed in separate jars and labeled as sample area 1, 2 and 3. Note: In this case, there would be three samples taken for each sampling date required as opposed to one composite sample for each date interval e.g. 7, 14, 21 and 30 days.

- 1 Once your initial sample is taken, apply 40 ounces of water to the oiled soil and till or



turn the soil.

- 2 Mix the three ounces of OSE II with 150 ounces of water for a total volume of 153 ounces, which will require a container with the capacity of a gallon and a half. ( This is the minimal amount of OSE II to use, we know it is a bit stronger than 50 to 1, this is to show you OSE II in fact works in a very small setting)

3 Apply the 153 ounces of OSE II and water mixture evenly across the soil's surface until all the mixture has been applied. Spraying is the preferred method of application, but if you cannot access a sprayer, mixing it with water and pouring it over the spill site evenly can be done.

4 Stick the end of the tube from the aerator into the center of the soil and turn on and leave on for the duration. Of the demonstration.

5 24 hours after applying the OSE II and water mixture, measure the moisture content with the moisture meter and apply the necessary water to get the moisture above 50%, extra water is not a problem.

#### **IV. SAMPLING/TESTING INTERVALS:**

1 7 days after applying OSE II, extract a sample of soil from 3 different points in the middle of the container see diagram above under Section III, step 4.

2 REPEAT same sampling method within 14 days after applying OSE II.

3 REPEAT same sampling method as above after 21 days.

4 REPEAT same sampling method as above after 30 days.

**NOTE:** Extract the samples from the same point/area each time and place the three samples in a jar, mix the samples, seal the lid and label the jar. If using 3 separate sample standard, put samples in separate jars and label each of the samples area 1, 2 and 3 for Day 7, 14, 21, 30 respectively.

#### **V. MAINTAINCE:**

1 Check the moisture level each day with the moisture meter; write down in a log the moisture level. If the moisture level is below 50% add water until the moisture level is above 50% and you can see the water puddling on the surface of the sludge /soil, and note how much water was added. Watwr must be extracted no less than 24 hours from the same area the water was collected for the mixing with OSE II.

2 Turn or till the soil three times a week with the small spatula, and make a note of each time the soil is turned in your written log.

3. Each time the soil is to be tilled scrape any oil on the sides of the container onto the soil then till.

#### **VI. Observations**

Write down initial observations as well as smells. Each time a noticeable change/observations or action takes place note it with date, time and what was observed exactly. Also take pictures as often as possible or video.

## **Site Parameters Information Required Questions to Develop an Engineered Step By Step Instructions to Address a Sites Contamination**

Questions .

I. Where is the spill/contamination site?

II. Is the contamination on soil, ground water, below soil surface or above, on fresh/salt/or brackish water, shoreline or solid surface, or container?

III. If contamination is on soil, what type of soil, and what is the depth of penetration, and has the contaminate reached ground water, and is there any associated water bodies near the site area?

1. If there is any associated areas of water near the site, is it fresh, salt or brackish, and is the site tidally influenced?

IV. If contamination is on soil and below the surface, what type of soil is in the area, and what is the area contaminated, and is there any associated water bodies near the site area?

1. If there is any associated areas of water near the site, is it fresh, salt or brackish, and is the site tidally influenced?

Note if spill area is on rocky surfaces or soil mixed with rocks, describe the rocks sizes. Inches, feet or yards, and or ml, cm, meters?

V. Is the contamination on a solid surface such as concrete or asphalt?

VI. Is the site containing ground water?

1. If so do you know the size of the contaminant plume, and the size of the groundwater area or reservoir?
2. Is the ground water contained or moving?
3. If the reservoir is not contained what is the speed it is moving, feet per second, miles per hour, distance in 24 hours, meters per second, kilometers per hour, or distance in 24 hours?
4. 4. What is the porosity of the soil

VII. Fresh water, if the spill is on fresh water is it on a lake, river, stream pond, or Aquifer.

1. Fresh water is the spill contained or is it moving.
2. If moving what speed, feet per second, miles per hour, distance in 24 hours, meters per second, kilometers per hour, or distance in 24 hours?
3. If spill is on a moving body of water have any barriers been put in place?
4. Does salt water back up into the creek, stream, or river, if so for what period or is it constant in a 24 hour period?

VIII. Aquifer, is it fresh or salt water?

1. What speed does the water move, feet per second, miles per hour,
2. distance in 24 hours, meters per second, kilometers per hour, or distance in 24 hours?
3. Is the spill floating or has it settled to the bottom?
4. Has the plume of contaminant been model/size determined?

IX. Salt water, is the spill on a closed bay, open ocean, intertidal zone, ect?

1. Bay if in a bay is there a danger of fire destroying man made property?
  2. Does the bay flush very little, somewhat, or completely?
  3. Are there any fresh water creeks, rivers, or streams feeding into the bay?
  4. If so how many?
- A. Open Ocean, is the spill moving towards land or out to the open ocean?
1. Are there any man made structures, or islands in the path of the spill?
  2. Have booms been put in place and if so are they controlling the spills movement?

XI. Intertidal Zone, Marsh or Estuary

1. Is the spill contaminating the shoreline?
2. Is the shoreline sand, soil, rock or man made/or multiple types, denote each if more than one?
3. What is the tide level, inches, feet/cm meters?

XII. Storage container, refined, unrefined, or petrochemical.

1. What is the size of the storage container?
2. What is the storage container made of.
3. Are there vents, or openings that allows access to all areas of the container?
4. What was stored in the container?
5. Is there sludge in the container, if so what would be the depth of the sludge?
6. How long has it been since the container was last cleaned out

XIII. In all cases

1. What is the volume of the spill, or the length X width X depth?
2. What type of contaminant has been spilled?
3. How long has the spill been in place?
4. What type of water, fresh-lake, river, stream, pond or well, brackish, or salt water is nearby if none of these are available, is tap water nearby?
5. Does the area have 4 seasons, if so what is the ambient average air temperature, for each?
6. How much rain does the area get a year?

XIV. Are there any special areas, that need protecting like water intakes, or species that may reside in the area, or structures, man made or naturally occurring, or special circumstances that we need to be made aware of?

XV. We would appreciate it if we could receive any pictures or videos of the site.